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(54) Multi-panel sliding partition

(57) Sliding leaf door, comprising two or more independent leaves, each of which is suspended from trucks (2) which move along independent rails (3) with a general C-shaped cross section. The lower lateral segment (4) of the rail defines a rolling track on which rests and travels a wheel (6) of trucks (2). The upper lateral segment (5) internally defines an inverted groove (7) which houses vertical shaft wheels (8) of trucks (2). Segments (4, 5) have an external longitudinal groove (9) to receive alignment and junction rules (10) between consecutive rails.

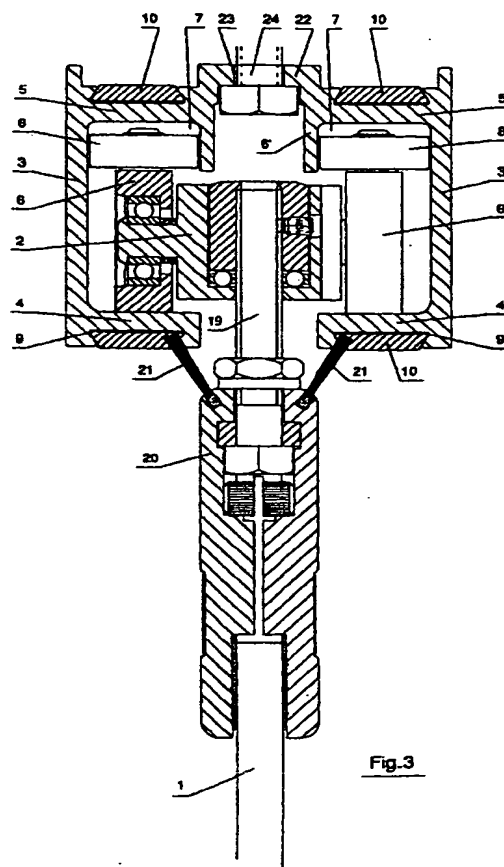


Fig.3

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EP 1 035 287 A2

Description

[0001] The present invention relates to a door with sliding leaves comprising two or more leaves suspended from upper guide rails by trucks which can move along said guide rails.

[0002] This type of door is for example used as moving partitions, in order to transform or divide the surface of a large hall or space, and comprise leaves which may be placed consecutively aligned in order to subdivide a space, or attached to each other in parallel in a stacking or folding area occupying a minimal space.

[0003] Each of the leaves is suspended from two trucks which move along independent guide rails which run parallel and near each other along the path in which the leaves can define a partition, and when reaching the stacking area the rails separate and finally define end parallel segments with a separation equal to that of the leave trucks.

[0004] A door of this type is described in French Patent 506.626, in which the rails consist of independent C-sections opposite each other, the ends of which run horizontal and are placed opposite each other, with these end segments bearing an external longitudinal lip adjacent to the free edge. The truck moves along the outermost surface of the lateral upper segment and the longitudinal lip acts as a stop to prevent its derailment. The lower lateral segments of both sections define guide rails for a vertical-shaft wheel on the truck.

[0005] Said construction implies a complicated and expensive structure, and does not provide a reliable operation.

[0006] Patent EP 0311.752 discloses a translation truck for connecting sliding elements in the form of a plate, which is meant to suspend panels or sliding door leaves meant for forming sliding partitions. The truck has a single wheel and there is a guide plate to guide said wheel. The two C-section rails form a single bar along the path in which the leaves form a partition or door. The truck wheel travels on the lower lateral segment of the C-sections. This construction does not ensure a good operation and furthermore, the leave suspension system does not allow using glass panels with a minimum reliability.

[0007] Lastly, Patent DE 9211932.8 U relates to a rail guide system for sliding doors in which the rolling surface of the truck is defined by the inner surface of the lower lateral segment of the section, as in EP 0311.752, but where under said segment is defined a groove open on the bottom whose vertical walls act as guides for a vertical shaft wheel. This construction requires the structure of the truck to extend beneath the guide rail, forming a widening in which the vertical shaft wheel is mounted which results in a further complication. Along the path in which the leaves are extended the two rails form a single section which requires external supports embracing said section for its support.

[0008] The object of the present invention is to

solve the aforementioned problems by means of a door of the type mentioned above in which the rails, forming one or two sections, together with the trucks from which the leaves are suspended, have a simple construction which allow a proper operation ensuring the correct positioning and smooth sliding of the trucks.

[0009] A further object of the invention is to provide rails which along the extended path of the leaves form a single section which may be directly affixed to the ceiling without requiring auxiliary supports.

[0010] A further object of the invention is to obtain good support and adjustment of the opposing edges of consecutive leaves when the latter are extended.

[0011] These and other objectives are achieved according to the invention by simplifying the rail structure, which must provide a horizontal rolling surface for the truck and vertical guide surfaces for the vertical shaft wheel which prevent these trucks from pitching.

[0012] For this purpose, according to the invention in the lower lateral segment the rails define on their inner surface the rolling path for the trucks, while the upper lateral segment forms an inner inverted groove which is placed above the horizontal rolling path defined by the lower lateral segment, which groove is meant to house two vertical-shaft wheels of the trucks which will rest on either vertical wall of the aforementioned groove.

[0013] In this way, the rail section has a simple structure as it forms a C-section one of whose segments is prolonged as an internal segment parallel to the central segment in order to define the aforementioned inverted vertical groove.

[0014] According to a further characteristic of the invention, the lateral segments of the rails form externally a dove-tail section longitudinal groove, meant to house alignment junction rules of equal section between consecutive rails.

[0015] The trucks of the door of the invention comprise a chassis on which are mounted a central roller element with a horizontal shaft, two vertical shaft wheels above the horizontal shaft wheel, one on either side of it, and a central vertical revolving bushing on which a vertical shaft will be fitted to suspend the leaf. The bushing and the horizontal shaft rolling element have co-planar shafts.

[0016] In the segments where the leaves are extended, the two rails form a single section, so that the two rails are joined on the top by a segment provided with orifices for support screws.

[0017] In order to prevent direct contact between leaves, when these are extended, according to the invention shock-absorbing gaskets are provided in their vertical edges which consist of a rigid fluted bar which can be adjusted to said edges. The bottom of this bar is surrounded by a flexible cover which will deform as the leaves are extended, forming a sealing and shock-absorbing element.

[0018] All the above characteristics, as well as further ones characteristic of the invention as set forth in

the Claims, are now described in greater detail with the aid of drawings which show an example of a non-limiting embodiment..

[0019] In the drawings:

Figure 1 is a front elevation view of a door constructed according to the invention with its leaves extended.

Figure 2 shows the path of the trucks of the door of the invention with the leaves extended and folded.

Figure 3 is a cross-section of the door of the invention along the line III-III of figure 1, in an enlarged view.

Figure 4 is a side elevation view of one of the trucks from which the leaves are suspended with a sectional view of one of the vertical shaft wheels.

Figure 5 is a vertical section of the truck along the line V-V of figure 4.

Figure 6 is a top view of the truck of figure 4.

Figure 7 shows the bar of the shock-absorbing gasket of the vertical edges of the leaves.

Figure 8 show a cross section of the position of the gaskets of two co-planar, consecutive extended leaves.

Figure 9 is a lateral elevation view of an end-run stop to limit the displacement of the trucks.

Figure 10 is a vertical section view of the door of the invention, similar to figure 3, showing an alternative embodiment which includes the stop of figure 9.

[0020] The door shown in figure 1 comprises a number of leaves, each of which is suspended from trucks labelled (2), which can move along as many independent rails (3).

[0021] Rails (3) run parallel and next to each other along the segment where leaves (1) can be extended, then separating to finally form parallel end segments (3') which are opposite each other at a distance equal to the separation of trucks (2) of a same leaf (1). Along paths (3) leaves (1) are aligned consecutively, while in segments (3') they are parallel and next to each other, in a folded or tucked position.

[0022] As shown in figure 3, the two rails (3) can form a single section along the path in which leaves (1) are extended.

[0023] Rails (3) have C-sections, with lateral segments (4 and 5) horizontal. The lower horizontal segment of each rail defines a rolling track on which a horizontal shaft wheel (6) of trucks (2) may rest and

move. Upper lateral segment (5) ends in a vertical lip (6') which together with the central segment defines an inverted groove (7) in which a vertical shaft wheel (8) is housed, which also belongs to trucks (2). During the displacement of trucks (2) vertical shaft wheel (8) shall rest on the internal or external surfaces, preventing trucks (2) from pitching.

[0024] The two lateral segments (4) and (5) of each rail externally define longitudinal grooves (9) with dovetail cross-sections to house alignment and junction rules (10) with equal sections between consecutive leaves.

[0025] As can be seen best in figures 4 or 6, each truck (2) comprises a chassis on which are mounted a central roller element (6) with a horizontal shaft, two vertical shaft wheels (8) above the horizontal shaft wheel, one on either side of it. Each truck also has a central revolving bushing (11) with a vertical shaft threaded on the inside and supported by a bearing (12). Rotation of bushing (11) is limited by a screw (13) inserted through an opening (14) in the casing wall. Bushing (11) and rolling element (6) have co-planar perpendicular shafts. As shown in figure 5, wheel (6) is mounted by a bearing (15) on a core (16) of chassis (2) at a radial position with respect to bushing (11). Likewise, wheels (8) are mounted by means of bearings (17) on spigots (18) which project from chassis (2).

[0026] In each bushing (11) of the trucks is attached a vertical shaft (19), figure 3, bearing a clamp (20) of a known construction for holding leaf (1). The elements of clamp (20) may be provided with protection brushes (21).

[0027] As shown in figure 3, when the two rails (3) form a single section this has an upper intermediate separation area (22) provided with orifices (23) for anchoring screws or bolts (24). In this manner the section is directly attached to the ceiling or any other surface without requiring further supports.

[0028] In order to prevent the vertical edges of the panels from impacting against each other when in the extended position of figure 1, according to the invention on said vertical edges of the panels are mounted shock absorbers (25), figure 7, for example with a trapezoidal structure, whose walls are provided with flexible internal tabs (26) which ensure the adherence of the gasket to the surface of leaf (1). The bottom of this gasket will be surrounded by a flexible cover (27) which will deform when the leaves are in the position of figure 1 as shown in figure 8, acting as shock-absorbing and sealing elements between consecutive leaves.

[0029] The path of trucks (2) along rails (3) is limited by end stops (28) consisting of an L-bar, one of whose segments has an inner surface provided with a thickening (29) with a dove tail section which can be fitted snugly in groove (9) of the lower lateral segment of sections (3), as seen in figure 10. The other segment of the L-bar is attached to the inner edge of segment (4) of section (3), and ends in a thickening (30) in which is fit-

ted, from one of the end transverse sections, a rubber plug (31) or the like against which truck (2) will impact when it reaches the end of the allowed path.

[0030] In the example shown in figure 10 they are independent and related by means of a connection bridge (32) provided with orifices for anchor bolts (24). 5

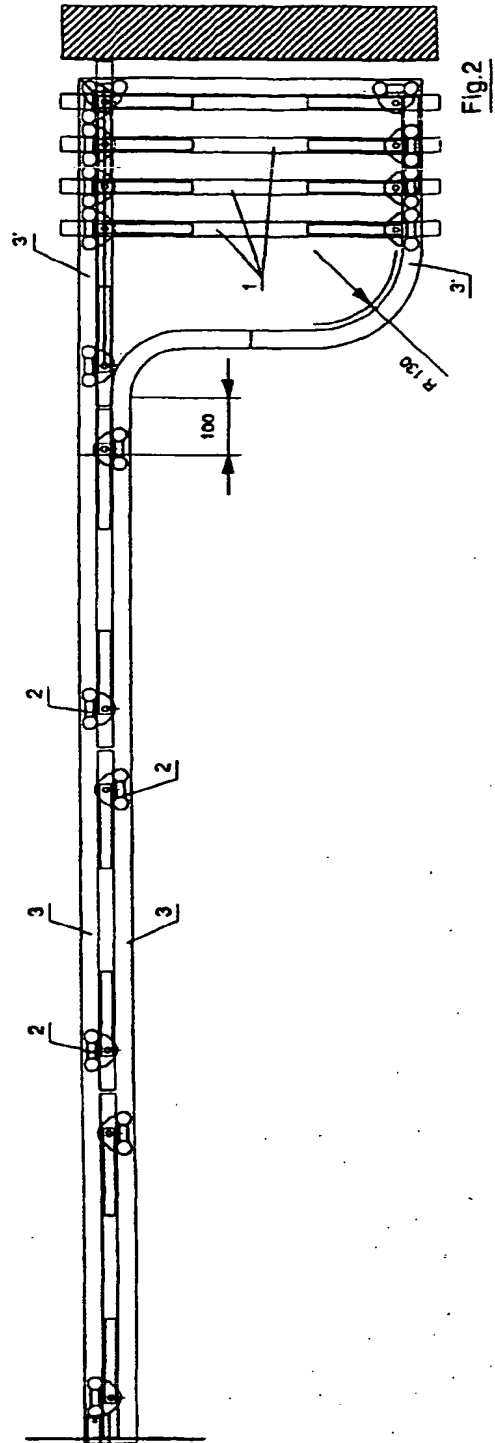
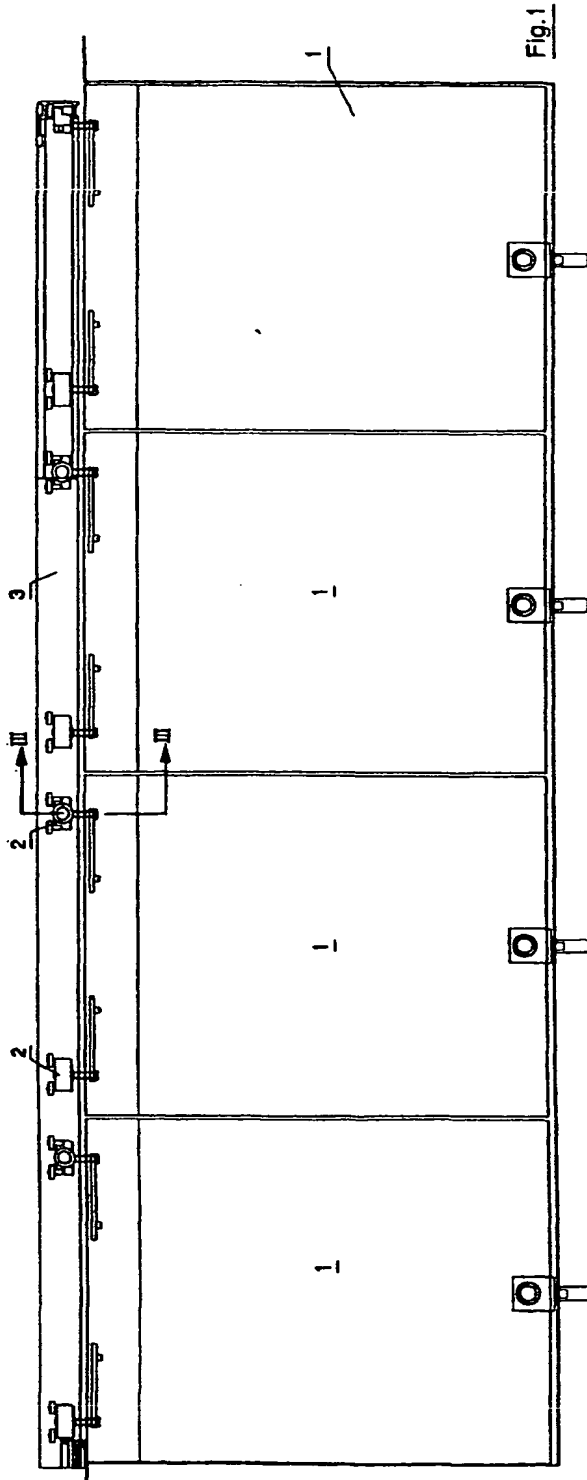
[0031] In the embodiment of figure 10, shaft (19) suspended from trucks (2) bears in its lower end a guide section (33) meant to be embedded in the upper edge of a wooden leaf or the like. 10

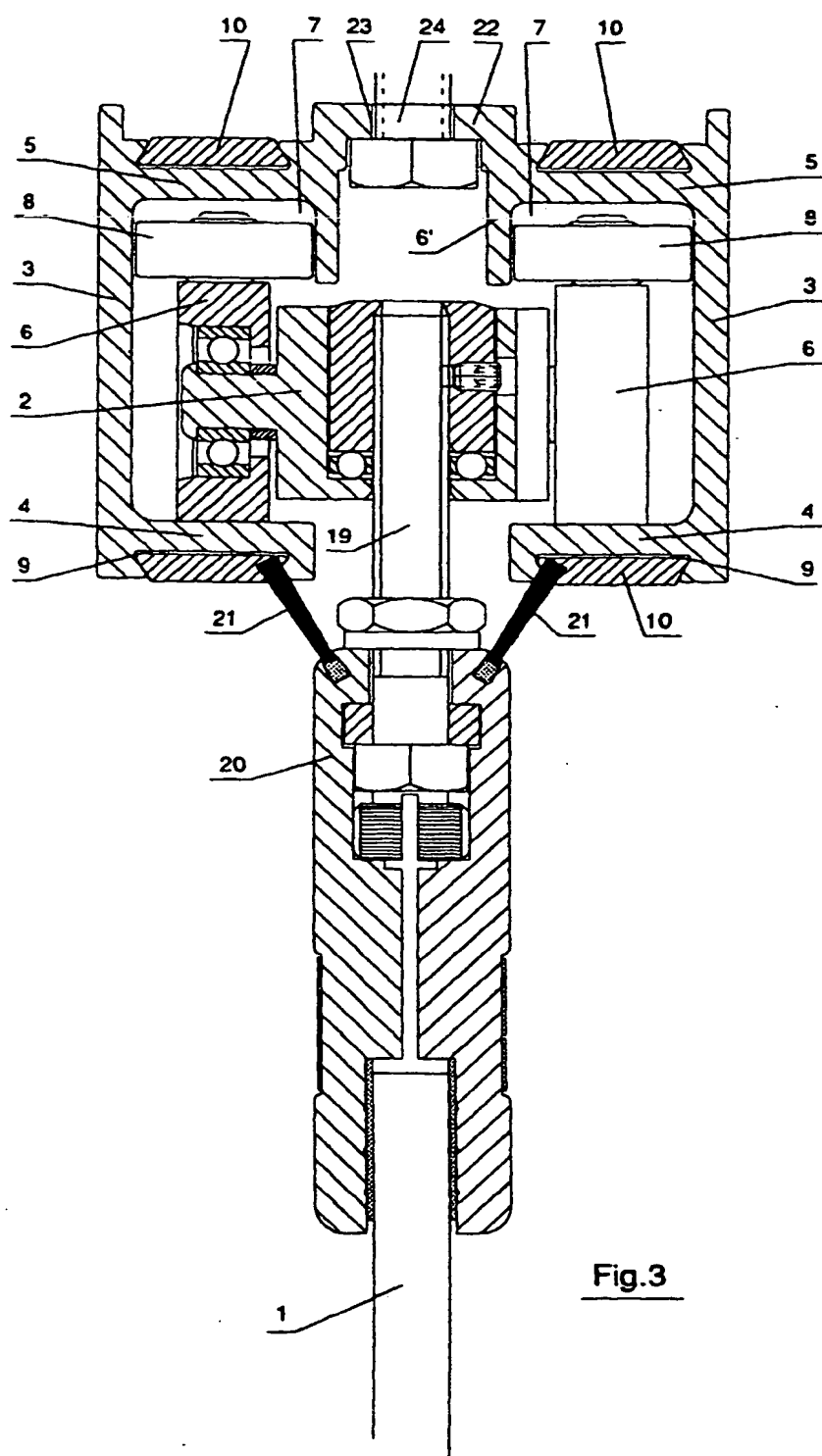
[0032] Clamp (20) shown in figure 3 is particularly suited for holding leaves (1) made of glass or the like, while guide section (33) of figure 10 allows suspension of wooden panels or leaves.

[0033] In this latter case the lower edge of the wooden panel may incorporate a guide section (33) identical to the upper guide section which shall bear a shaft (34) on whose lower end is mounted a bushing (35) which may be inserted between flaps or tabs (36) of a lower guide rail (37). 15 20

Claims

1. Sliding leaf door, comprising two or more independent leaves, each of which is suspended from two trucks (2) which move along independent rails (3) with a general C-shaped cross section, one of whose lateral segments (4) defines laterally a lower rolling track on which rests and travels a horizontal shaft wheel (6) of trucks (2), characterised in that the other lateral segment (5) of rails (3) internally defines an inverted groove (7) which is placed above the horizontal rolling track and is meant to house vertical shaft wheels (8) of trucks (3) which rest on either vertical wall which define the aforementioned groove (7), while externally lateral segments (4, 5) of rail (3) show a longitudinal groove (9) with a dove-tail section which, between consecutive rails, receives alignment and junction rules (10) of an identical cross section. 25 30 35 40
2. Door as in claim 1, characterised in that trucks (3) comprise a chassis on which are mounted a central roller element (6) with a horizontal shaft, two vertical shaft wheels (8) above the horizontal shaft wheel, one on either side of it, and a central revolving bushing (11) with a vertical shaft (19) which projects from the bottom of rail (3) for suspending leaf (1), with shaft (19) of said bushing (11) and horizontal-shaft rolling element (6) all co-planar. 45 50
3. Door as in claim 2, characterised in that aforementioned vertical-shaft bushing (11) is mounted in a housing which has a wall provided with an opening (14) through which may be inserted a screw (13) which is threaded in a radial orifice in the wall of bushing (11) in order to lock the vertical shaft associated to it. 55
4. Door as in claim 1, characterised in that the vertical edges of leaves (1) are fitted with shock-absorbing gaskets (25) comprising a stiff fluted bar with a trapezoidal cross section, whose walls are provided with flexible internal retention tabs (26) and the bottom of which is surrounded by a flexible cover (27).
5. Door as in claim 1, including in rails (3) stops (28) which limit the displacement of trucks (2), characterised in that said stops (28) consist of an L-bar, one of whose segments has in its inner surface a longitudinal lip (29) with a dove-tail cross section which matches that of the external longitudinal grooves (9) of lateral segments (4) of rails (3), while the other segment of the L ends in a thickening (30) which bears in one of its end segments a head or stop (31) made of rubber or the like.





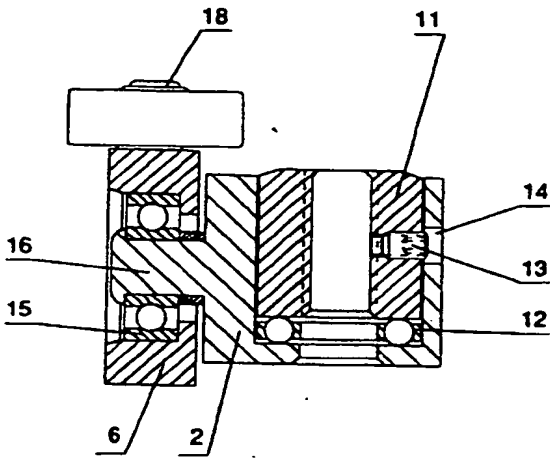


Fig.5

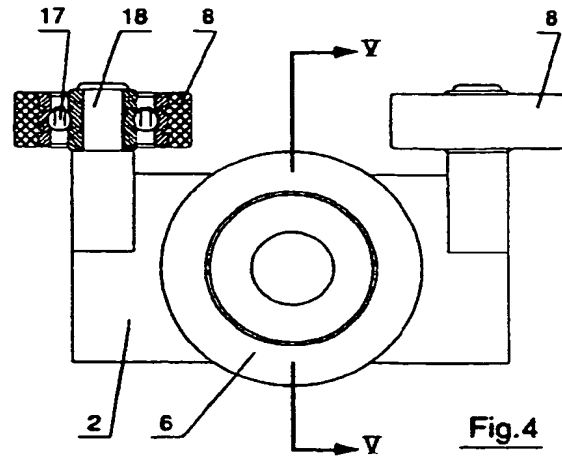


Fig.4

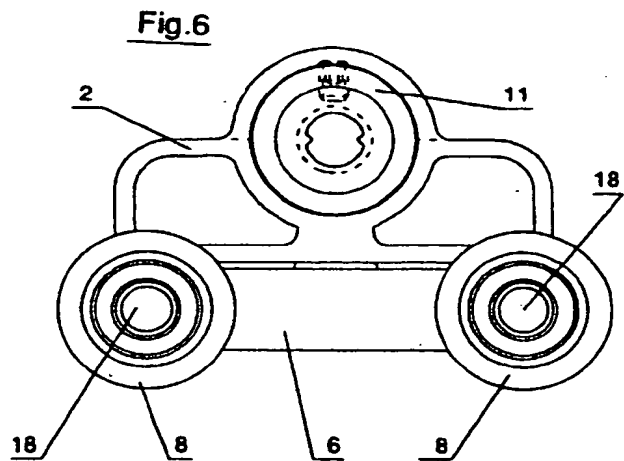


Fig.6

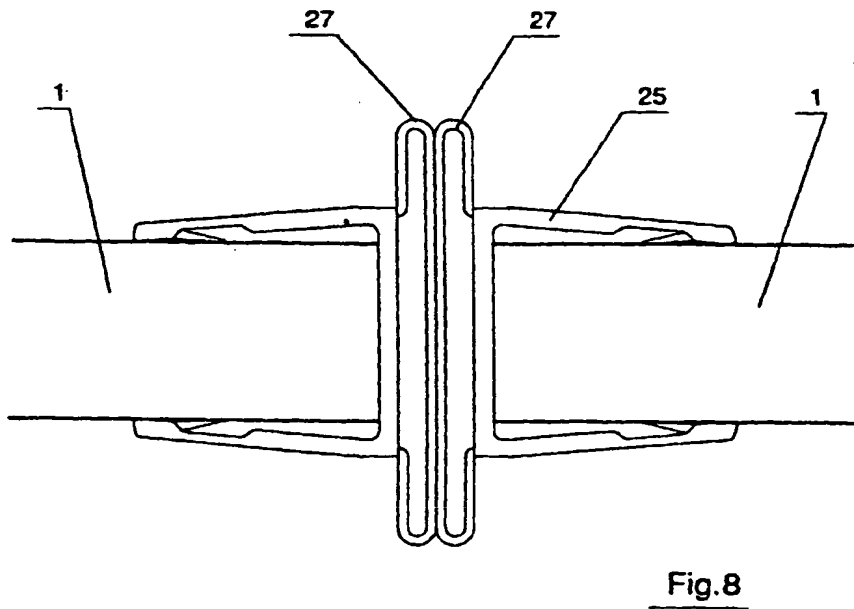
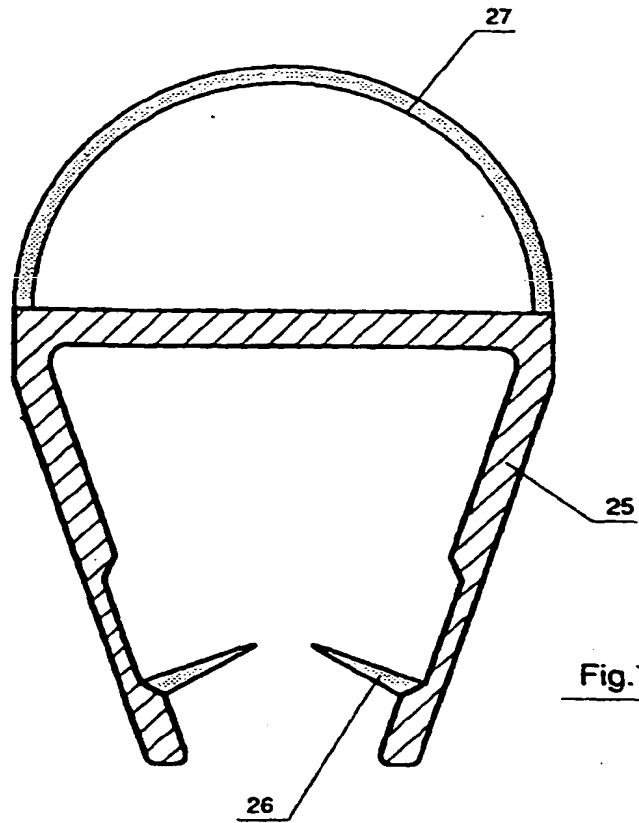
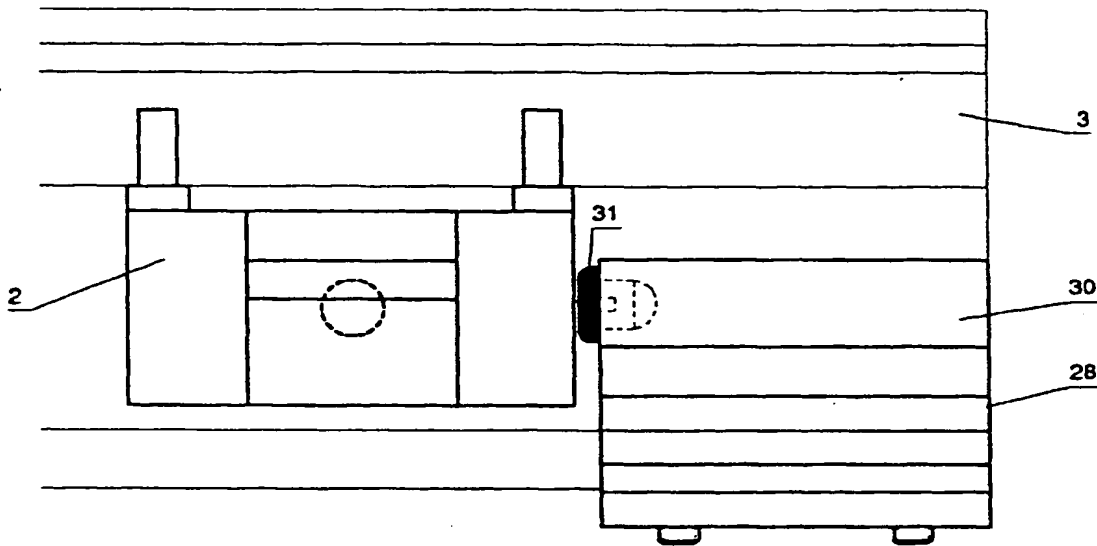


Fig.9



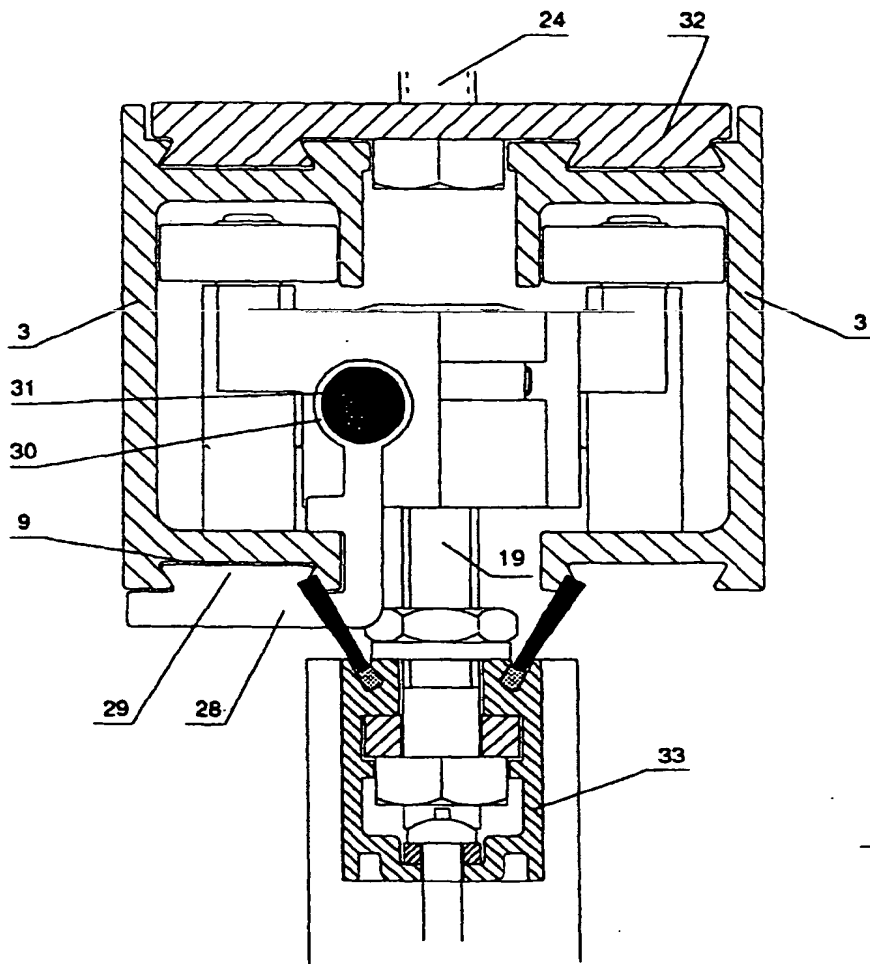
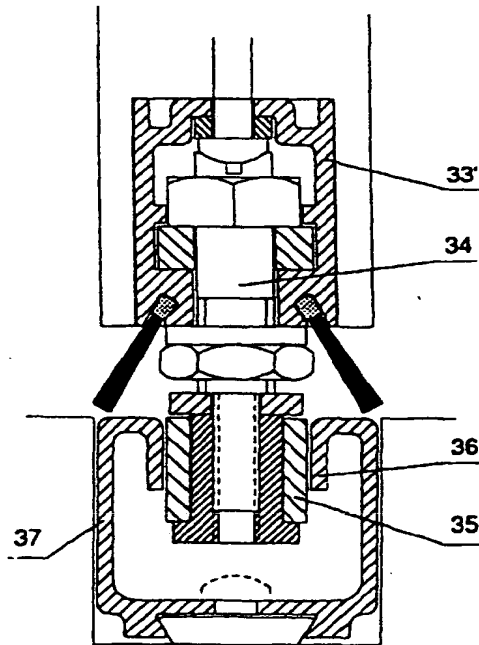


Fig.10



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